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RE-EXPLORATION OF HARTMAN'S CAVE, NEAR STROUDSBURG, PENN-
SYLVANIA, IN 1893.

BY H. C. MERCER.

Rumor had reported the existence of a cave in Monroe County, Pennsylvania, which Mr. T. Dunkin Paret after some searching discovered in 1880 on the top of a hill overhanging Cherry Creek,

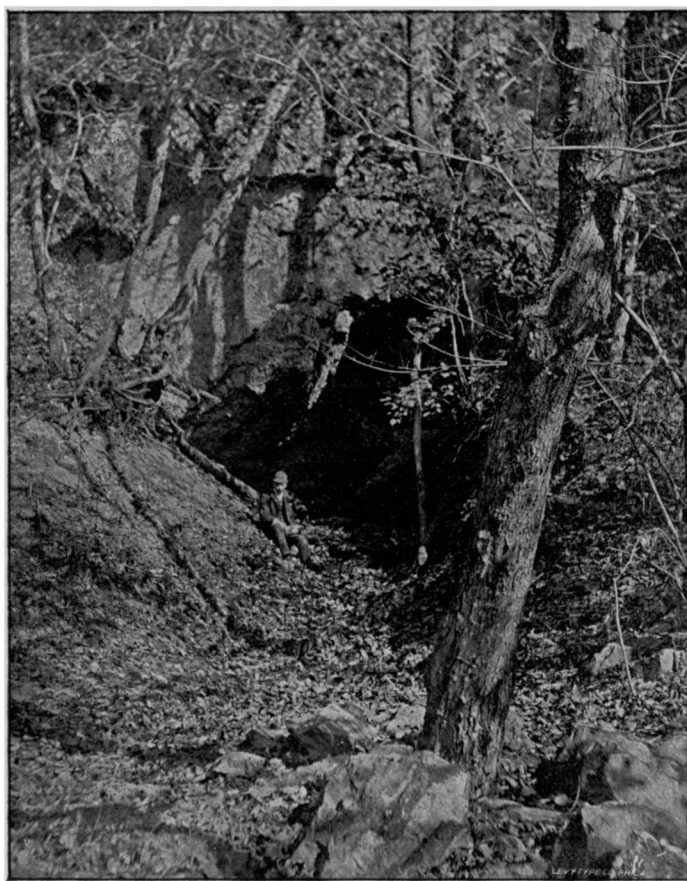


FIG. 1. Entrance to Hartman's Cave.

about four miles from Stroudsburg. Eight hundred feet above and five miles west of the Delaware River, with its nearest drinking water, the creek, one-fourth of a mile down the steep, and eight or nine miles north of the glacial moraine, the damp, chilly hole seemed hardly a good lair for beasts, much less a shelter for men.

Original discoveries of Mr. Paret.—When Mr. Paret had removed the debris which choked its broad arch, Fig. 1, so that a man could scarcely wriggle like a snake 150 feet in, he encountered traces of men and animals in a top layer of limestone roof-splinters and down-slidden outer talus thinning inward into less stony cave earth. All this relic-bearing material lay upon a bed of clay of unprobed depth which appeared to over-spread the whole cave bottom, and it was always above this clay and never in it, that Mr. Paret's workmen found (often in his absence, for business prevented his continued supervision) the specimens collected: the thin chipped blade of argillite (fifty feet in to the extreme right; depth not stated, the four bone awls; the potsherd, (outside the entrance on a ledge); the bone fish-hook, needle and harpoon;¹ along with remains of the lynx, gray fox, wolf, skunk,

¹ I have just recieved the following interesting letter from Mr. Paret:
Stroudsburg, Pa., March 25, 1894.

DEAR SIR:

Yours of 10th at hand and I am obliged for your letter and for your slip as to the cave discussion at the Academy of Nat. Sciences. Have you had the clay examined microscopically? If not, it might be advisable. Something might be learned as to its origin.

The potsherd was not dug out. It was not found by my men, but a visitor who picked it up *from the surface*, from that shelf of rock, away up on the right, (as you face the cave) where I and a man worked a little while you were there. It was *outside* of the cave entirely, on a rock shelf, at foot of cliff, away above the cave level. The shell has a curious history: One of my men brought it to me. His two boys got into a quarrel at home, he interferred and found they were disputing for the shell. He asked where it came from and they said, from the cave; so he took it away from them. He told me it was full of clay and that he washed it out. He is a man in whom I have implicit trust. The argillite blade and peccary jaws were found about same time and place—about 50 feet inside of cave, on extreme right. The fish-hook was found on same side, but not so far in. I do not think there is anything to prove how old the horse tooth is. The one striking fact to me is that no stone tool has been found at any depth or dug out. The potsherd was on bare rock. The arrowhead I found was in earth on a flat rock—only a few inches covered and a few inches of earth below. But the bone tools were all dug from below the surface. Boys talk is that many stone tools used to be picked up on the rock shelves inside of the cave. Why were none found in the soil as those of bone were?

I feel sure that if stone was in free use when the bone was, some would have been found with the bone. . . . I am firm in my belief that your trench is of small value till a *much longer one* is extended at right angles outwards. I also believe that if all the debris in front of cave was removed much more might be found. Your trench simply proved that no human or animal remains were contained in a cross cut of that length and narrow width. There is room outside it for many hearths at various levels.

Yours truly,

T. DUNKIN PARET.

weasel, raccoon, mole, dusky rat, little brown bat, woodchuck, porcupine, beaver, muskrat, gray squirrel, ground squirrel, meadow mouse, white field mouse, wood rat, gray rabbit, deer, elk, wild turkey, turtle, box turtle, snapper, snake, three species of *Helix*, a *Unio* and a *Margaritina*, besides (to make the discovery particularly noteworthy) the following remarkable objects:

(1) A perforated marine shell² bead made from the *Conus tornatus*, alleged by a farmer to have been brought from the cave trench by his little sons, which, on the authority of Mr. Geo. W. Tryon in 1880, and Mr. Pilsbry in 1894, belongs to the Pacific Coast mollusca of Central America and which therefore suggests the whole question of aboriginal trade and the query whether the cave occupants had really obtained a shell from somewhere nearly two thousand miles away.

(2) Several teeth of the reindeer (*Rangifer caribou*) which seem to infer a colder climate.

(3) A tooth of *Bison americanus* asks us to account for the presence of this browsing animal of the Mississippi Plains in the easternmost mountain steeps of the great forest.

(4) The jaws and teeth of the extinct peccary, *Dicotyles Pennsylvanicus*, which with (5) the teeth of the extinct giant chinchilla, *Castoroides ohioensis*, suggest antiquity, though we cannot yet prove that these animals became extinct in Pennsylvania more than 300 years ago.

(6) Two teeth of a horse, discovered at a point and depth not noted, which Dr. Leidy (who visited the cave in 1880 and identified all the bones then found by Mr. Paret, see Ann. Report of Geolog. Surv. of Pennsylvania, 1887, p.1-20) says belong to an indigenous species. If this be so it may well set us to wondering what aborigines on the hilly upper Delaware were doing with horses before the time of Columbus.

² Mr. Paret has not understood that my cross trench in the outer talus (see Fig. 2) contained both human and animal remains, in fact revealed a layer of Indian occupancy, 1 foot thick and 1 1-2 to 2 feet below the surface. This layer must once have continued into the cave and the only question is was it the only layer in the cave or were there other layers under it which I did not find outside? Why, asks Mr. Paret, were no stone tools found underground (if the knife is an exception) by Mr. Paret's men? There is nothing un-Indian about the bone tools found.

I should answer: because the men had missed seeing the few small, dull looking objects that would have told the tale. The single barbed bone arrow or spear is common to Eskimo and Indian, and there is, I believe, nothing un-Indian about any of the bone tools discovered.

outer talus, our examination of the remaining small fringes of debris brought us to the first question :

Were the animal and human remains contemporaneous?

If they were not, no matter what the bison, horse, chinchilla and reindeer meant in the cave, their bones told us little of the date of Man's visit, and their discovery formed no interesting link between archæology and paleontology. Our trench 40 feet in from the entrance, 3 feet, 8 inches wide, and 22 feet, 3 inches long, dug for possible hidden layers and bottom, at right angles across the cave floor showed a continuous homogeneous bed of exquisitely fine clay, deposited in thin laminæ rarely sprinkled with sand pockets and underlaid with a film of sand resting on an uneven limestone floor at 5 feet, 11 inches; 10 feet, 7 inches; 11 feet, 6 inches and 14 feet, 1 inch.

As no sign of life, no interrupting layer from top to bottom was apparent, it seemed that it could be relieved of all connection with Mr. Paret's discoveries. The animal remains and human refuse must have all belonged to the debris and cave earth above it, and it only remained to be asked before we were done with this all important test of stratification whether Mr. Paret's relic-bearing upper deposit of roof slivers, rotten leaves, human relics, bones, charcoal and ashes, gathered dust and inrolled talus consisted of one layer homogeneous throughout, telling of one uninterrupted time of occupation, or of several layers differing in character, separated by interplaced bands proving time intervals between the visits of Man and beast. The trouble was that nearly all this cave floor material had been dug away and all we had to guide us was what was left of it, its outer end so to speak, in the talus. But when we cut into this talus just outside the entrance we did what we would have done had we explored the cave at the start, and when we found a thin layer of human occupancy in it 1 foot thick and $1\frac{1}{2}$ to 2 feet below its surface we inferred that this human layer was but a continuation of the lost human layer inside the cave. Yet as the conditions for soil formation outside probably differed from those inside the cave, and as we only penetrated 10 to 12 feet into the outer talus without reaching the clay or its equivalent that should have been below it, there was a chance that our talus was not a fair end slice of the cave, and that there might have been several human layers inside against the single one in the talus outside.

Too much critical ground had been lost and we had to be satisfied

with the rediscovery of one human layer at least, which we had a right to call either the single layer or the uppermost of a series of layers originally found in the cave. To its date or to a later time evidently belonged the bones which Professor Cope, who has assisted me in this work, has kindly identified of the turkey, chipmunk, cat squirrel, marmot, smaller vole, larger vole, short tailed shrew, raccoon, skunk, gathered by Mr. Paret and myself in the aforesaid side fringes of debris just inside the entrance.

But as to the original bones found in 1880, careful side cutting into the cave floor in the first place might have shown which of the discovered fragments were really part of the cave feast too well bedded between the fire sites to have been scratched out of older under layers and into newer and later layers and which were not, but these clues have been lost.

In some caves every bone found has seemed fairly and clearly part of the Midden heap. But it was against all the evidence produced at Hartman's that the place had been a lurking hole for small animals. Some had come into the crevices to die, leaving their skulls. Others, whose bones rodents had gnawed, had been brought in by carnivora in the first place or carried by pilfering rodents from the human feast.

There is, therefore, only a probability that Man killed and ate the bison, castoroides and peccary in Hartman's Cave, since, minus the lost layers, we may say that there is no proof that these animals did not come there to die, or that they were not carried in whole or piecemeal by large carnivora when their bones, though lying on the cave floor long before Man's advent, would have come in close contact with his subsequently built hearths.

The nature of the human remains. No proof that they were not of Indian make.—As to the second question: Were the remains Indian remains? The Trenton gravel Man if we grant his existence must be ruled out of Hartman's Cave, for there was not one of his described rude, leaf-shaped, turtle backs found among the chipped blades and arrowheads that in themselves denied his existence there. Whether the human remains found by Mr. Paret came from the same layer in which I found mine or from other layers now untraceable, there is no need of searching for a new and as yet undescribed cave occupant to account for the bone awls common at the Trenton Delaware Valley site found by me in the Indian layers at the Forge Cave in

Virginia, at the Hummelstown Cave in Dauphin County, Pennsylvania and at the Nickajack and Lookout Caves in Tennessee. The hammerstone, argillite cache blade, pottery and chert arrowheads are duplicated at the Lenape villages at Point Pleasant, Ridges Island and Gallows Run on the Delaware River, while the single barbed bone spear from a shell heap explored by me in September 1891 on York River, Maine, can be again referred to the Red Man.

We may safely say that the notion of a precedent people vanished at Hartman's Cave, and that the only Man that I found there or that I have reason to suppose that Mr. Paret found there as the possible contemporary of the reindeer, and bison, extinct peccary and giant chinchilla was the chert-using, pottery-making Indian of the Delaware Valley, already the possessor of the bow and arrow and the quarry denoting cache blade.

Antiquity of the human remains.—When we ask the third question: Were the human remains of geological antiquity or of modern date and, granting the association of the extinct mammal bones, use their presence to prove great age. We must remember that the absence of historical mention which largely gives the word "extinct" its meaning, and which in Europe reaches back 2000 years at once, has here as yet but a proved retrospect of hardly more than three centuries. The fact that John Smith or the Jesuits did not observe the peccary in the northern United States does not disprove its scanty or straggling existence in their time, and we cannot be certain that, as Jefferson supposed, a few superannuated mammoths were not hiding in forest corners as late as the 18th century. Only the correlation of the fauna of many more caves with human remains can give us a just notion of the time-span of many of these animals and make definite the still vague border line between archaeology and paleontology.

The problem of the clay.—It is for geology to explain the exquisitely fine laminated clay containing no sign of life that so deeply covers this cave floor.

It must have been quiet water holding mud in solution that laid it there, film upon film, nor could the process have been arrested by dry intervals or the visits of men and beasts, since no dissimilar, dry laid or life betokening stratum interrupts it. How this beautiful clay, widely unlike the coarse, red deposits in the Lookout and Nickajack Caves in Tennessee or the Durham Cave, 10 miles below Easton on

the Delaware, got into its place with nowhere save the gritty hill crest just above to come from, is the question. Could it have been the residuum of the rock decomposition which originally formed the cave cavity or in other words the rubbish of cave erosion choking up three-fourths of the eroded hole?³ We would know how and why successive pools of yellow mud-bearing water could cover the floor once upon a time and not now, where the water came from, since any down running rivulet would have rolled in the hillside grit with it, and why the flooding process was not interrupted by intervals, when animals came in and debris was formed?

A possible answer to these questions seems to be suggested in the important and interesting fact that Hartman's Cave lies eight miles north of the glacial moraine, differing therein by position from all other caves in the United States lying to the southward of the now well-known silhouette of pebbles that profiles the southern limit of ice advance. It is therefore one of those glaciated caves distinct and individual by position, full, perhaps, of new secrets for us, which, if the glacial theory be true, must have been sealed up with superincumbent ice like a tightly corked bottle throughout most of the frozen period.

If this clay is due to the banking up of ice and the draining of muddy glacial waters into the caves' mouth then we can account for it, but if ice damming and ice water had nothing to do with it, and on the other hand it is due to a subsequent submergence of the hill top below water level in the Champlain period, then similar clay beds ought to be found in caves, like Durham, south of the moraine and their absence remains to be accounted for.

Moreover if this clay is glacial then other caves north of the moraine should show the same ice-sealed barrier, beyond which no preserved relic of post glacial age penetrates.

The Indian and his relics, the fossil *castoroides* and peccary, were left behind as we got down into the clay with nothing before us it seemed but the beginning of the cavern itself. Was the cave then no older than the melting ice? If so, why and how had the

³ If this were the case the composition of the clay should, I am told, show its limestone parentage. But no carbonates have been found in it to suggest that it was a near relative of limestone, while on the other hand it showed the same reactions as clay dredged up from the bottom of the Delaware River, near Chester.

disintegrating streamlets which made it at the same time nearly filled it with the residuum of their own erosion? If it was older than the ice sheet, why were no tertiary fossils associated with the quaternary? None of the bones that protrude from the bleak gorges in the bad lands of Texas to frighten Indians have ever been found in subterranean rock hollows. We found none of these in or below this clay in Hartman's Cave. Had they never lain there, or, coming in like their quaternary successors, had they been washed out, or, as Prof. Cope suggests, had the whole tertiary fossil-bearing end of the cave been eroded away in the lapse of time? However this may be, if we are right, the clay in Hartman's Cave marks with the precision of a pointing clock hand, the hour of the glacier in the world's history. What is under the clay comes before what is over it, after the ice.

If the ice made the clay we must go back, not to any event since the clay (post glacial) or any event during the clay-making (glacial) but to some event before (preglacial) to find a force, whether of cave washing or cave erosion, that could have swept this cave clean of the fossil remains of creatures that lived before the quaternary.